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DIAGNOSIS OF SOME DISEASES OF THE PERIPHERAL ARTERIES

Functional or vasomotor disturbance

Acrocyanosis. This is a condition characterized by persistent blueness of the skin, which extends distally from the level of the wrists or affects the feet. The skin is cold and moist. Acrocyanosis occurs very rarely in this country.

Raynaud's disease. This is a condition characterized by intermittent short attacks of pallor which affect the fingers or toes and frequently is associated with or followed by cyanosis and rubor. Bilateral involvement is essential for diagnosis. Gangrene, if present, is superficial and limited to small pin-head sized regions of the skin, usually of the finger tips. The peripheral arteries pulsate normally and there is no evidence of persistent arterial occlusion. Sclerodactylia and recurrent paronychial infections are not uncommon. Pain is minimal and usually limited to numbness during pallor and burning sensation during rubor. Raynaud's disease should be considered whenever there are transient episodes of discoloration of the digits on exposure to cold or during acute emotional stress. Cervical rib, pneumatic hammer disease, scleroderma, diseases of the nervous system and chronic occlusive arterial disease, thrombo-angiitis obliterans and arteriosclerosis obliterans should be excluded before a diagnosis of Raynaud's disease is made as all of these may be characterized by, or associated with, vasomotor disturbances.

Erythermalgia. This is a name which has been given to a condition originally named erythromelalgia, which is an inadequate term since it does not indicate the presence of warmth but only indicates redness and pain. The term "erythermalgia" indicates reddish discoloration, warmth and pain affecting the extremities. Such a diagnosis should be considered whenever a patient complains of burning distress in the extremities. The condition is frequently associated with polycythemia vera. There is no occlusion of the peripheral arteries.

To demonstrate the essential relationship between skin temperature and distress, one must increase the temperature of the skin to a point at which distress occurs. This can be accomplished in several ways: 1. Reflex vasodilatation can ordinarily be accomplished by means of a baker containing five or six carbon filament lamps so supported that they are about 18 inches (46 cm.) above the skin of the abdomen and thorax. A blanket is placed over the baker and the feet are exposed to room air. The temperature of the air within the baker usually is between 50° and 60° C. Sometimes, simply wrapping the extremities in blankets will cause an adequate increase in the temperature of the skin. 2. Direct warmth can be applied by enclosing the extremity within a rough blanket tent, within which a lighted carbon filament bulb is placed.

If erythermalgia is present, burning distress occurs as the temperature of the skin increases. Ordinarily, burning occurs when the temperature of the skin is increased to about 32° C., and this burning increases in intensity as the temperature of the skin is still further increased. If the mechanism for increasing the temperature of the skin of the extremity is removed and the temperature decreases, the distress disappears. Ordinarily, the critical point of temperature varies less than 1° C. in repeated observations, although different patients have somewhat divergent critical points. If distress is induced repeatedly, a resistant phase may occur, during which distress cannot be produced even though the temperature of the skin is increased satisfactorily. If the distress is proved to be dependent upon the temperature of the skin, the diagnosis of erythermalgia is established. Confirmatory findings are an increase in the distress when the extremity is placed in the dependent position or when the venous pressure is raised by means of a sphygmomanometer cuff, and a decrease in the distress when the extremity is elevated or immersed in cold water.

Organic disturbances

Thrombo-arteriosclerosis obliterans and thrombo-angiitis obliterans. These are occlusive arterial diseases of the extremities. The former is due to arteriosclerosis and the latter to inflammation of the arteries. Their presence should be suspected whenever unexplained gangrene affects the extremities, whenever intermittent claudication occurs, whenever there is recurrent superficial phlebitis and whenever the extremities are cold, discolored or affected by episodes of discoloration. The most characteristic symptom is intermittent claudication which occurring in the calf of the leg is usually described by patients as a "cramp." The pain which occurs only with walking increases in severity and the patient comes gradually to a halt, but the pain is never severe and lancinating and never makes the patient cry out or stop abruptly. Rest gives relief almost immediately; soreness, tenderness on pressure, and fatigue persist for some time. In the ankle, toes and ball of the foot it is of a different character, usually described as a sensation of walking barefoot on graveled roads or cobblestones. In the muscles of the forearm, wrist, or single finger the pain is

similar to that experienced in the region of the calf. The diagnosis of chronic occlusive arterial disease is based on the finding of diminution or absence of pulsations in the dorsalis pedis, posterior tibial, popliteal, femoral, radial or ulnar arteries. Confirmatory signs are abnormal coldness of the extremities, excessive pallor when the extremities have been elevated for a few minutes, slow return of color when the extremities are put in the dependent position after elevation, and abnormal redness or cyanosis when they have been in the dependent position for a few minutes.

In general, an age more than fifty years, roentgenologic evidence of calcification of arteries in the legs, and the presence of diabetes or an increased concentration of lipids in the plasma favor the diagnosis of arteriosclerosis obliterans. Superficial phlebitis occurs only in thrombo-angiitis obliterans. Thrombo-angiitis is more apt to cause occlusion of arteries of the upper extremities than is arteriosclerosis. Jews can have either disease but a disproportionately high percentage of patients who have thrombo-angiitis obliterans are Jews.

Embolism and sudden thrombosis. If one examines the extremities for the condition only when severe pain, pallor and coldness exist, sudden arterial occlusion will be overlooked in many cases. The symptoms are frequently minimal and bizarre. Embolism or sudden thrombosis should be suspected whenever pain, numbness, coldness or tingling involve extremities either acutely or subacutely. Examination of the arteries of an extremity for pulsations should be carried out routinely under the circumstances noted. The chief findings are absence of pulsation in some of the arteries in which pulsations were previously present, lowered surface temperature, pallor and the loss or diminution of reflexes, sensation and muscular strength. The absence of pulsations in arteries which were known or assumed to have been pulsating previously is the most important diagnostic sign. This abnormality in conjunction with lowered surface temperature and pallor of an unusual degree is pathognomonic of arterial occlusion. The surface temperature can be estimated with sufficient accuracy by alternately placing the back of the hand on the normal and diseased extremities.

Thrombophlebitis is the only condition which may be distinguished with difficulty from sudden arterial occlusion. Ordinarily the normal temperature, edema, distended veins and normal arterial pulsations observed in cases of thrombophlebitis serve as an adequate contrast to the lowered temperature, collapsed veins and diminished or absent pulsations in the arteries in cases of sudden arterial occlusion. However, arterial pulsations may be absent temporarily in cases of phlebitis, apparently as a result of spasm.

Cervical rib with arterial thrombosis. This condition should be suspected whenever pain, discoloration, decreased skin temperature and gangrene affect the fingers. The abnormal rib may be palpated in the supraclavicular space but diagnosis depends upon the roentgenogram. Signs of arterial occlusion are the same as those of thrombo-angiitis obliterans and arteriosclerosis obliterans. Vasomotor disturbances may exist without arterial thrombosis.

Arteriovenous fistula. This condition is characterized by direct, abnormal communications between arteries and veins of the extremities. Congenital arteriovenous fistulas, which are abnormalities of development, are usually multiple while acquired arteriovenous fistulas are usually single and follow injury such as stab wounds or gunshot wounds. Arteriovenous fistula should be suspected whenever an extremity is of different size than its companion member and there is no explanation for such a difference in size; whenever varices do not conform to the usual type, ulcerations on legs are particularly resistant to healing or there has been a penetrating wound of the extremity. Elongation of the limb is almost constant in cases of congenital fistula; it may characterize acquired fistula if it is sustained before the epiphyses close. Thrill and bruit over acquired fistulas are almost always present but are absent in about 80 per cent of cases of congenital fistula. Decrease in pulse rate with closure of the fistula by digital pressure is almost constant in cases of acquired fistula but usually absent in cases of congenital fistula. In both types the skin of the involved extremity is almost always warmer in some regions than is that of the companion member. Arteriography may demonstrate the abnormal communications. Study of the saturation of oxygen in venous blood of the extremity is a conclusive method of diagnosis. If it exceeds that of normal venous blood and that in a similarly situated vein of an opposite extremity, one may conclude that arteriovenous fistula exists. Frequently, one can determine the presence of fistula by seeing the abnormally bright red blood which flows into the barrel of a syringe when blood is drawn from a superficial vein.

Temporal arteritis. This is a condition characterized pathologically by chronic inflammation of the temporal artery and periarterial tissues. It is characterized clinically by headaches which are more or less constant, frequently worse at night than they are during the day and associated with general malaise, lassitude, fever and night sweats. Sneezing or coughing frequently accentuates the pain, which is so severe as to require opiates occasionally. Two to five weeks after onset of the symptoms mentioned, the temporal arteries become tortuous, enlarged and prominent, and tender to touch. Along the course of the arteries, reddish raised nodules are either visible, palpable, or both. Small nodules may be palpated over the scalp. In the early stage of the condition, pulsations are present in the main branches of the temporal arteries but as the inflammation increases the arteries become completely thrombosed so that the pulsations cease. The body temperature ranges from 98° to 103° F., the leukocyte count varies from 7,500 to 13,500 and usually there is mild anemia. Occasionally there is retinal phlebitis with hemorrhages and exudates. The entire course of the disease is usually from four to six months and terminates in recovery.

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